

Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

Claims 1-93 (canceled).

94. (currently amended) An optical semiconductor device comprising:

a bulk crystal substrate of GaN;

lower and upper cladding layers formed epitaxially on said bulk crystal substrate of GaN;

and

an active layer formed epitaxially between said lower and upper cladding layers,

said bulk crystal substrate of GaN comprising a slab of a GaN single crystal produced by

a process comprising the steps of:

forming a molten flux of a volatile metal element in a pressurized reaction vessel confining therein said molten flux together with an atmosphere containing N (nitrogen), such that said molten flux contains Ga in addition to said volatile metal element;

growing GaN in the form of a single crystal body in said molten flux; and

supplying a compound containing N directly into the atmosphere in said reaction vessel from a source located outside said reaction vessel during growth of said GaN single crystal,

wherein said bulk crystal substrate of GaN has a defect density of 10^3 cm^{-2} or less.

95. (previously presented) The optical semiconductor device as claimed in claim 94,

wherein said GaN single crystal slab has a stoichiometric composition in the thickness direction thereof.

96. (previously presented) An electron device comprising:

a bulk crystal substrate of GaN;

a channel layer formed epitaxially on said bulk crystal substrate of GaN;

a gate electrode provided on said channel layer; and

source and drain electrodes provided on said channel layer at respective sides of said gate electrode,

said bulk crystal substrate of GaN comprising a slab of a GaN single crystal produced by a process comprising the steps of:

forming a molten flux of a volatile metal element in a pressurized reaction vessel confining therein said molten flux together with an atmosphere containing N (nitrogen), such that said molten flux contains Ga in addition to said volatile metal element;

growing GaN in the form of a single crystal body in said molten flux; and

supplying a compound containing N directly into the atmosphere in said reaction vessel from a source located outside said reaction vessel.

97. (previously presented) The electron device as claimed in claim 96, wherein said GaN single crystal slab has a stoichiometric composition in the thickness direction thereof.

98. (previously presented) The electron device as claimed in claim 96, further comprising an epitaxial layer of a nitride formed on said bulk crystal substrate, wherein said

epitaxial layer includes said channel layer formed epitaxially on said bulk crystal substrate of GaN.

99. (previously presented) The electron device as claimed in claim 98, wherein said epitaxial layer further includes a barrier layer of a nitride formed epitaxially on said channel layer.

100. (previously presented) The electron device as claimed in claim 99, wherein said gate electrode is provided in Schottky contact with said barrier layer.

101. (previously presented) The electron device as claimed in claim 98, further comprising an active part formed in said epitaxial layer for switching a flow of carriers transported through said epitaxial layer.

102. (previously presented) The electron device as claimed in claim 101, wherein said active part includes said gate electrode provided over said channel layer in correspondence to a channel region defined therein, said source electrode provided over said channel layer at a first side of said gate electrode, and said drain electrode provided over said channel layer at a second side of said gate electrode, and wherein said source electrode injects carriers into said channel layer, and said drain electrode collects carriers from said channel layer.

103. (previously presented) The electron device as claimed in claim 96, wherein said

bulk crystal substrate has a thickness exceeding about 100 μm .

104. (previously presented) The electron device as claimed in claim 96, wherein said bulk crystal substrate has a thickness exceeding about 300 μm .

105. (previously presented) The electron device as claimed in claim 96, wherein said single crystal of GaN constituting said bulk crystal substrate belongs to a hexagonal crystal system.

106. (previously presented) The electron device as claimed in claim 96, wherein said GaN single crystal constituting said bulk crystal substrate belongs to a cubic crystal system.